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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/805,792	03/22/2004	Eric Gustave Lundquist	A01041A	9932

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EXAMINER

WU, IVES J

ART UNIT	PAPER NUMBER
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1713

DATE MAILED: 01/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/805,792	Applicant(s) LUNDQUIST, ERIC GUSTAVE	
	Examiner Ives Wu	Art Unit 1713	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 21-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 21-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date: _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>3/22/2004</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claims 5-20 are cancelled.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

- (1). **Claims 34 - 36** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. On line 1 of claim 34, it recites a plurality of catalysts treated as blend which is not implied or disclosed in the applicant's specification.

Claim Rejections - 35 USC § 102/103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

(2). **Claims 1-4 and 21-33** are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Lundquist (US005233096A).

(3). Lundquist (US005233096A) disclose a strongly acidic cation-exchange resin beads made by functionalizing jetted, suspension-polymerized, crosslinked, styrenic copolymer beads with sulfonic acid groups produce an unexpectedly high level of conversion when catalyzing condensation reactions, particularly the condensation of phenol with aldehydes or ketones to form bisphenols (Abstract). The styrenic monomers useful in preparing the crosslinked copolymer beads include styrene and substituted styrenes such as α -methylstyrene, vinyl toluene, ethylvinylbenzene, vinyl naphthalene and the like. The crosslinking monomers containing a plurality of ethylenically unsaturated functional groups include aromatic crosslinking monomers such as divinylbenzene, divinyltoluene, trivinylbenzene. The crosslinking monomer is preferably presented at levels from about 0.1% to about 20 wt% of the total monomer. Preferred crosslinking monomer is divinylbenzene (Col.2, line 33-55). The jetting suspension-polymerization process useful for forming the crosslinked copolymer beads results in uniformly

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sized droplets and uniformly sized copolymer beads (Col. 3, line 3-6). The copolymer beads used to make ion-exchange resins are preferably spherical beads, and a uniform bead size throughout a particular batch of copolymer is desirable because it produces uniform, predictable hydraulic properties, such as flow rate and pressure drop for a bed of the resin in a reaction vessel. The size of the beads depends upon the size of the monomer droplets that form, and various techniques are used to control the diameter and uniformity of the droplets (Col. 1, line 37-49). The preferred strong-acid functionality is the sulfonic acid group, and known processes for sulfonating the copolymer may be used, including sulfonation processes which monosulfonate the aromatic ring and those which substitute the aromatic ring with more than a single sulfonic acid group. The preferred sulfonation produces a strongly acidic cation-exchange resin with a cation-exchange capacity of from about 4.8 to about 5.4 milliequivalents per gram (dry basis) (Col. 4, line 3-9). The reactions catalyzed by the strongly acidic cation-exchange resin beads include the condensation reaction of phenol and acetone. The strong acidic ion-exchange resin beads optionally in the presence of from about 1 to about 40 wt% of the strongly acidic ion-exchange resin beads, optionally in the presence of from about 1 to 40 wt% of mercaptan reaction promoter, preferably ethanethiol, aminoethane-thiol or dimethyl-thiazolidine (Col. 4, line 22-41).

The patentee's process by which these resin beads are made, which comprises the steps of: (a) jetting a mixture of one or more styrenic monomers, one or more crosslinking monomers and a free radical polymerization initiator into a moving, aqueous suspending medium to form uniformly sized monomer droplets, (b) heating the droplets to a temperature above the suspending medium, (c) separating the resulting polymer beads from the suspending medium, (d)

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drying the beads, (e) functionalizing the beads with strongly acidic cation-exchange groups (Col. 2, line 4-19).

(4). As to the monounsaturated vinylaromatic monomers from 90 to 99.9 wt% in the catalyst in the **independent claim 1**, Lundquist disclose the crosslinking monomer is preferably presented at levels from about 0.1% to about 20 wt% of the total monomer (paragraph 3). The balance will be 80 to 99.9 wt% for monounsaturated vinylaromatic monomers.

As to the catalyst containing 0.1 to 1.0 millimole sulfone groups per gram dry catalyst in the **independent claim 1**, having an acid capacity of 4.0 to 6.0 millimole sulfonic acid groups per gram dry catalyst in the **dependent claim 2**, Lundquist discloses the catalyst having a cation-exchange capacity of from about 4.8 to about 5.4 milliequivalents per gram (dry basis) (paragraph 3), in view of substantially identical catalyst compositions and slightly different process of sulfonation disclosed by Lundquist, and by applicant, it is examiner's position to believe that the catalyst of Lundquist would inherently possess the amount of sulfone groups, acid capacity. Since USPTO does not have proper means to measure the properties or to conduct the experiments, the burden now is shifted to applicant to **prove** otherwise. *In re Fitzgerald*, 205 USPQ 594 (CCPA 1980).

As to the catalyst comprising at least one sulfone cross-linked ion exchange resin having improved resistance to deformation under pressure in the **independent claim 1**, in view of the substantially identical catalyst compositions and slightly different process of sulfonation between Lundquist and by applicant, it is examiner's position to believe **some** of the sulfonic groups form sulfone linkages in the results of sulfonation process taught by Lundquist and the catalyst of

Lundquist would inherently possess the improved resistance to deformation under pressure.

Since USPTO does not have proper means to conduct the experiments, the burden now is shifted to applicant to **prove** otherwise. *In re Fitzgerald*, 205 USPQ 594 (CCPA 1980).

As to the catalyst comprising 0.6 mmol of aromatic rings having two sulfonic acid groups per gram of dry catalyst and catalyst comprising 0.2 mmol of sulfone bridging group per gram of dry catalyst in the **dependent claim 24**, in view of the substantially identical catalyst compositions and slightly different process of sulfonation between Lundquist and by applicant, it is the examiner's position to believe that the catalyst of Lundquist would inherently possess 0.6 mmol of aromatic rings having two sulfonic acid groups per gram of dry catalyst and catalyst comprising 0.2 mmol of sulfone bridging group per gram of dry catalyst. Since USPTO does not have proper means to conduct the experiments and measure the properties, the burden now is shifted to applicant to **prove** otherwise. *In re Fitzgerald*, 205 USPQ 594 (CCPA 1980).

(5). As to the limitation of **independent claim 26**, the disclosure of Lundquist is incorporated herein by reference, the most subject matters of copolymer component having between 1.0 and 6.0 wt% of divinylbenzene cross-linking, at least one sulfone cross-linked ion exchange resin having improved resistance to deformation under pressure has been recited in the applicant's claims 1, 2, 4 and 24 in a narrower scope, and has been discussed in the paragraph (3) and (4).

As to the catalyst having acid capacity of greater than 4.0 mmol/g and having 0.1 to 1.0 mmol/g of sulfone bridging groups per gram dry catalyst in the **independent claim 26**, in view of the substantially identical catalyst compositions and slightly different process of sulfonation between Lundquist and by applicant, it is the examiner's position to believe that the catalyst of

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Lundquist would inherently possess acid capacity of greater than 4.0 mmol/g and having 0.1 to 1.0 mmol/g of sulfone bridging groups per gram dry catalyst. Since USPTO does not have proper means to conduct the experiments and measure the properties, the burden now is shifted to applicant to **prove** otherwise. *In re Fitzgerald*, 205 USPQ 594 (CCPA 1980).

As to the limitations of **dependent claim 27**, the disclosure of Lundquist is incorporated herein by reference, the most subject matters of 1 – 4 wt% of divinylbenzene crosslinking, having acid capacity of greater than 5.1 mmol/g in the applicant's claim 26 has been recited in the applicant's claim 1 and 26, and has been discussed in the paragraph (3) and (4).

As to the limitation of **dependent claim 28**, the disclosure of Lundquist is incorporated herein by reference, the most subject matters of spherical beads catalyst prepared from jetted, suspension polymerized polystyrene/divinylbenzene copolymer in applicant's claim 27 has been recited in the applicant's claim 3, and has been discussed in the paragraph (4).

As to the limitations of **dependent claims 29-33**, the disclosure of Lundquist is incorporated herein by reference, the most subject matters has been recited in applicant's claims 4 and 21-24, and has been discussed in the paragraph (3) and (4).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

(6). **Claims 34-36** are rejected under 35 U.S.C. 103(a) as being unpatentable over Lundquist (US005233096A).

(7). As to the limitations of **independent claim 34**, the disclosure of Lundquist is incorporated herein by reference, the most subject matters of polymerized monomer units, sulfone groups contents, at least one sulfone cross-linked ion exchange resin for each catalyst in the plurality of catalyst in the independent claim 34 has been recited in the applicant's claim 1, and has been discussed in the paragraph (4).

As to the different levels of polyvinylaromatic crosslinking in the **dependent claim 34** and sulfone bridged crosslinking in the **dependent claim 35**, in view of overlapped range from 0.1 to 10 wt% for polyvinylaromatic crosslinking, slightly different sulfonation process disclosed by Lundquist and applicant, it is the examiner's position to believe that catalyst of Lundquist would inherently possess different level of polyvinylaromatic cross-linking by using different amount of polyvinylaromatic monomers for each catalyst and different levels of sulfone bridged cross-linking because **some** of the sulfonic groups form sulfone linkages in the results of sulfonation process taught by Lundquist. Since USPTO does not have proper means to conduct

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the experiments and measure the properties, the burden now is shifted to applicant to **prove** otherwise. *In re Fitzgerald*, 205 USPQ 594 (CCPA 1980).

As to the plurality of catalysts in the **independent claim 34**, since each catalyst of Lundquist is prepared in the same range of monomers composition, process, therefore it would have been obvious to one having ordinary skill in the art at the time invention was made to employ these known catalysts in combination. Furthermore, the person of ordinary skill in the art would have expected such a combination of catalysts to work in an additive or cumulative manner. *In re Kerkhoven*, 626 F.2d 846, 850, 205 USPQ 1069, 1072 (CCPA 1980). See §§ MPEP 2144.06.

As to the limitation of **dependent claim 36**, the disclosure of Lundquist is incorporated herein by reference, the most subject matters of catalyst in the form of spherical beads prepared from a jetted, suspension polymerized copolymer has been recited in the applicant's claims 2 and 3, and has been discussed in the paragraph (3) and (4).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ives Wu whose telephone number is 571-272-4245. The examiner can normally be reached on 8:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on 571-272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.


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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Examiner: Ives Wu

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Date: December 23, 2005


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SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700